

LISTING OF CLAIMS

This listing of claims will replace and supersede all prior versions and listings of the claims of this application.

1. (Currently Amended) A robotically controlled medical instrument comprising:
 - a first jaw;
 - a second jaw;

a drive mechanism including a linkage having a first end connected by a pivot joint to the first jaw and a second end provided with a pin positioned in a slot of the second jaw, the linkage providing increasing leverage to increase the force applied to an item grasped between the first and second jaws as the pin moves along the slot; and

an electronic controller that controls the operation of the drive mechanism.
2. (Original) The medical instrument of claim 1 wherein the slot has a curved segment and a straight segment.
3. (Original) The medical instrument of claim 1 wherein the drive mechanism includes a rotation piece connected to the first and second jaws by a second pivot joint, and a second linkage having a first end connected to the first linkage by the pin and a second end provided with a second pin positioned in the slot, rotation of the rotation piece causing a consequent rotation of the first jaw with respect to the second jaw, the first and second pins moving along the slot as the rotation piece rotates.
4. (Currently Amended) The medical instrument of claim 3 wherein the rotation piece is connected to a first drive cable, and the second jaw is connected to a second drive cable, respective tension being applied to the first and second drive cables to operate the one or both of the first and second jaws.
5. (Original) The medical instrument of claim 4 further comprising a shaft, the first and second jaws being supported at the distal end of the shaft, and the first and second drive cables extending through the shaft.

6. (Currently Amended) The medical instrument of claim 1 further comprising an accommodating mechanism that allows continued movement of the drive mechanism towards a locked position even after the first and second jaws contact a larger item so that the drive mechanism can move to the locked position when grasping items of different sizes.
7. (Currently Amended) The medical instrument of claim 6 wherein the accommodating mechanism is an extended end segment of the slot extending from the straight segment, the pin residing in the end segment when the first and second jaws grasp an item, the extent to which being dependent upon the size of the item being grasped.
8. (Original) The medical instrument of claim 6 wherein the accommodating mechanism is a compliance member.
9. (Currently Amended) The medical instrument of claim 8 wherein the compliance member is resilient member interposed between the linkage and the first jaw, the resilient member being compressed when the first and second jaws grasp an item, the extent of the compression of the resilient member being dependent on the size of the item being grasped.
10. (Currently Amended) The medical instrument of claim 8 wherein the compliance member is a hinge in one of the first and second jaws about which the respective jaw flexes, the amount of flexing being dependent upon the size of an item being grasped.
11. (Original) The medical instrument of claim 10 wherein the hinge is located below the furthest extent of a gap that extends into the respective jaw.
12. Canceled

13. (Currently Amended) The medical instrument of claim 1942-wherein the first jaw is coupled to a first drive cable, and the second jaw is coupled to a second drive cable, respective tension being applied to the first and second drive cables to operate the first and second jaws.

14. (Currently Amended) The medical instrument of claim 13 wherein the amount of tension being applied to the respective cables is controlled with the electronic controller coupled with a user interface operated by a user.

15. (Currently Amended) The medical instrument of claim 1942-wherein the accommodating mechanism is a compliance member.

16. (Currently Amended) The medical instrument of claim 15 wherein the drive mechanism ~~member~~ increases leverage through the a-linkage connected to the first jaw by the a-pivot joint, the compliance member being a resilient member interposed between the linkage and the first jaw, and being compressed when the first and second jaws grasp an item, the extent of the compression of the resilient member being dependent on the size of the item being grasped.

17. (Currently Amended) The medical instrument of claim 15 wherein the compliance member is a hinge in one of the first and second jaws about which the respective jaw flexes, the amount of flexing being dependent upon the size of an item being grasped.

18. (Original) The medical instrument of claim 17 wherein the hinge is located below the furthest extent of a gap that extends into the respective jaw.

19. (Currently Amended) The medical instrument of claim 12- A robotically controlled medical instrument comprising:
a first jaw;
a second jaw;
a drive mechanism which increases the force applied to an item grasped between the first and second jaws, the drive mechanism and the first and second jaws being provided with an accommodating mechanism that allows continued movement of the drive mechanism towards a

locked position even after the first and second jaws contact a larger item so that the drive mechanism can move to the locked position when grasping items of different sizes, wherein the drive mechanism includes a linkage having a first end connected by a pivot joint to the first jaw and a second end provided with a pin positioned in a slot of the second jaw, the slot having a curved segment, a straight segment extending from the curved segment, and an extended end segment extending from the straight segment, the accommodating mechanism being the end segment, the pin residing in the end segment when the first and second jaws grasp an item, the extent to which being dependent upon the size of the item being grasped; and
an electronic controller that controls the operation of the drive mechanism.

20-29. Canceled

30. (Currently Amended) The medical instrument of claim 29 further including A robotically controlled medical instrument comprising:

an instrument shaft having proximal and distal ends;

a tool supported from the distal end of said instrument shaft and useable in performing a medical procedure on a subject, said tool constructed and arranged so to be capable of receiving different size items and including a pair of work members, a drive mechanism which increases the force applied to an item grasped between the pair of work members, and an accommodating mechanism interacting with said drive mechanism and the pair of work members and that allows the pair of work members to be closed beyond a maximum grasping position so that the pair of work members can grasp items of various sizes;

a rotation piece coupling with one of said pair of work members and a pair of linkages one engaged with the rotating piece, and the other engaged with one of said pair of work members, said pair of linkages also pivotally supported relative to each other;

a robotic controller coupled to said instrument shaft for remotely effecting control of said tool.

31. (Original) The medical instrument of claim 30 including at least one drive cable extending via said instrument shaft for operating the rotating piece, and the other for operating the other work member.

32. (Currently Amended) The medical instrument of claim 30 wherein the accommodating mechanism comprises a compliance member.

33. (Currently Amended) The medical instrument of claim 32 wherein said the drive mechanism increases leverage through a linkage connected to a the first work member jaw by a pivot joint, the compliance member being a resilient member interposed between the linkage and the first work member jaw, and being compressed when the first work member and a second work member jaws grasp an item, the extent of the compression of the resilient member being dependent on the size of the item being grasped.

34. (Currently Amended) The medical instrument of claim 32 wherein the compliance member is a hinge in one of the pair of work members about which the respective work member flexes, the amount of flexing being dependent upon the size of an item being grasped.

35. (Currently Amended) The medical instrument of claim 29 A robotically controlled medical instrument comprising:

an instrument shaft having proximal and distal ends;

a tool supported from the distal end of said instrument shaft and useable in performing a medical procedure on a subject; said tool constructed and arranged so to be capable of receiving different size items and including a pair of work members, a drive mechanism which increases the force applied to an item grasped between the pair of work members, and an accommodating mechanism interacting with said drive mechanism and pair of work members and that allows the pair of work members to be closed beyond a maximum grasping position so that the pair of work members can grasp items of various sizes, wherein the drive mechanism includes a linkage having a first end connected by a pivot joint to a the first work member and a second end provided with a pin positioned in a slot of a the second work member, the slot having a curved segment, a straight segment extending from the curved segment, and an extended end segment extending from the straight segment, the accommodating mechanism being the end segment, the pin residing in the end segment when the first and second work members grasp an item, the extent to which being dependent upon the size of the item being grasped; and

a robotic controller coupled to said instrument shaft for remotely effecting control of said tool.

36. (Currently Amended) The medical instrument of claim 30-29 wherein the force applied by the first and second work members beyond the maximum grasping position is proportional to the size of the item being grasped.

37. Canceled

38. (Currently Amended) The method of claim 4137 wherein the applied force is directly proportional to the diameter of the item being grasped.

39. (Currently Amended) The method of claim 4137 wherein the proportional force is applied with the use of a resilient member associated with the first and second jaws.

40. (Currently Amended) The method of claim 4137 wherein the proportional force is applied with the use of at least one of the first and second jaws having a closable gap.

41. (Currently Amended) The method of claim 37 A method of grasping an item with a robotically controlled surgical tool comprising:

positioning the item between a first jaw and a second jaw of the tool, wherein the tool includes a drive mechanism, and wherein the drive mechanism includes a linkage having a first end connected by a pivot joint to the first jaw and a second end provided with a pin positioned in a slot of the second jaw, the slot having a curved segment, a straight segment extending from the curved segment, and an extended end segment extending from the straight segment that provides an accommodating mechanism, the pin residing in the end segment when the first and second jaws grasp an item, the extent to which being dependent upon the size of the item being grasped;

moving the first and second jaws to an initial contact position for grasping the item; and increasing leverage to the first and second jaws beyond the initial contact position to increase the force applied to the item grasped between the first and second jaws with the magnitude of applied force being proportional to the size of the item being grasped.

42-72. Canceled